

This listing of claims will replace all prior versions and listings of claims in this application:

c.) Listing of Claims

1. (currently amended) A method for fabricating a compound optic for short wavelength radiation, the method comprising:  
removing material of a substrate to form a surface profile of a first optical element of the compound optic; and  
forming ~~the a second optical element~~ zone plate lens of the compound optic on the substrate.
2. (original) A method as claimed in claim 1, wherein the step of removing the material comprises applying a tool tip of a turning machine to the substrate to mechanically remove the material.
3. (original) A method as claimed in claim 1, wherein the step of removing the material comprises directing a beam at the substrate.
4. (original) A method as claimed in claim 3, further comprising forming calibration features in the substrate.
5. (original) A method as claimed in claim 4, further comprising forming the calibration features by electron beam lithography.
6. (original) A method as claimed in claim 4, wherein the calibration features comprise linear scales in the plane of the first optical element.
7. (original) A method as claimed in claim 4, wherein the calibration features comprise trenches extending into the substrate.
8. (original) A method as claimed in claim 4, further comprising forming trench calibration features in the substrate prior to the step of directing the beam at the substrate.

9. (original) A method as claimed in claim 8, wherein the trenches are formed by lithography.
10. (original) A method as claimed in claim 8, wherein the trenches set the desired step profile for the first optical element.
11. (original) A method as claimed in claim 3, wherein the step of directing a beam comprises directing a laser beam at the substrate to ablate the material.
12. (original) A method as claimed in claim 3, wherein the step of directing a beam comprises directing an electron beam at the substrate to ablate the material.
13. (original) A method as claimed in claim 3, wherein the step of directing a beam comprises directing an ion beam at the substrate to ablate the material.
14. (original) A method as claimed in claim 3, wherein the step of directing a beam comprises directing a plasma beam at the substrate to ablate the material.
15. (original) A method as claimed in claim 1, further comprising forming an optical port on a backside of the substrate.
16. (original) A method as claimed in claim 15, wherein the step of forming the second optical element comprises forming the element in the optical port.
17. (original) A method as claimed in claim 15, wherein the step of forming the second optical element comprises forming a zone plate lens.
18. (original) A method as claimed in claim 1, wherein the step of removing the material comprises etching into the substrate through a patterned resist layer to transfer a pattern of the resist layer into the substrate.
19. (original) A method as claimed in claim 1, wherein the step of removing the material comprises selectively reacting a surface of the substrate to remove the material.

20. (original) A method as claimed in claim 19, wherein the step of selectively reacting the surface comprises directing a laser beam at the surface through a chlorine atmosphere.

21. (currently amended) A method for fabricating a compound optic for short wavelength radiation, the method comprising:

forming a surface profile of a first optical element of the compound optic on a substrate;

forming a fiducial mark on the substrate; and

forming ~~the~~ a second optical element of the compound optic by reference to the fiducial mark.

22. (currently amended) A method as claimed in claim 21, further comprising forming an optical port on a backside of the substrate.

23. (previously presented) A method as claimed in claim 22, wherein the step of forming the second optical element comprises forming the second optical element in the optical port.

24. (original) A method as claimed in claim 21, wherein the step of forming the second optical element comprises forming a zone plate lens.

25. (cancelled)

26. (cancelled)

27. (cancelled)

28. (cancelled)

29. (cancelled)

30. (cancelled)

31. (currently amended) A method as claimed in claim 1, further comprising

forming a fiducial mark on the substrate; and  
forming the ~~second optical element~~ zone plate lens of the compound optic by  
reference to the fiducial mark.

32. (currently amended) A method as claimed in claim 31, further comprising  
forming an optical port on a backside of the substrate.

33. (currently amended) A method as claimed in claim 32, wherein the step of  
forming the ~~second optical element~~ zone plate lens comprises forming the ~~second~~  
~~optical element~~ zone plate lens in the optical port.

34. (cancelled)

35. (new) A method as claimed in claim 23, wherein the step of forming the  
second optical element comprises forming a zone plate lens.

36. (new) A method as claimed in claim 21, further comprising thinning the  
substrate on a side of the substrate opposite the surface profile to form an optical  
port on a backside of the substrate.

37. (new) A method as claimed in claim 36, wherein the step of forming the  
second optical element comprises forming the second optical element in the  
optical port.

38. (new) A method as claimed in claim 36, wherein the step of forming the  
second optical element comprises forming a zone plate lens in the optical port.

39. (new) A method as claimed in claim 38, wherein the first optical element is a  
refractive optical element.

40. (new) A method as claimed in claim 38, Wherein the first optical element is  
a refractive Fresnel optical element.

41. (new) A method as claimed in claim 1, wherein the first optical element is a refractive optical element.

42. (new) A method as claimed in claim 1, Wherein the first optical element is a refractive Fresnel optical element.